



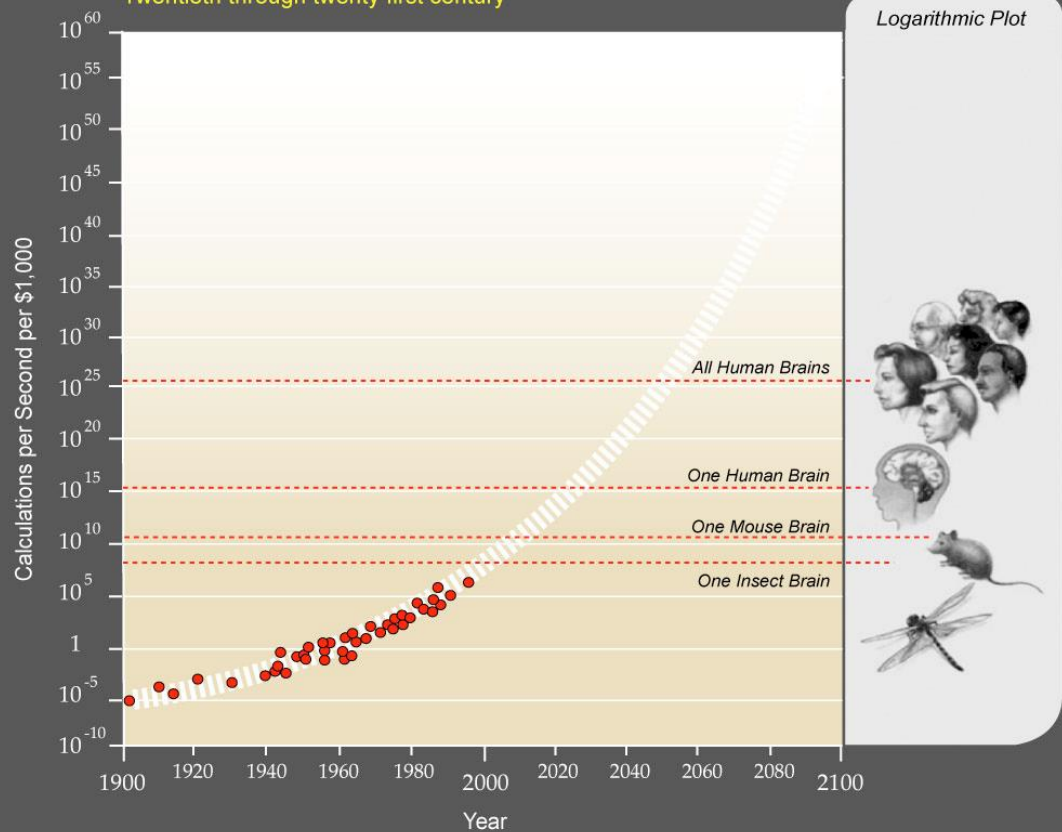
# A Future *with* Innovation

Dr. Omar Hatamleh, NASA JSC



## Exponential Growth of Computing

Twentieth through twenty first century



Out of 2,000 distinct types of work activities in 800 occupations


45% of work activities could be AUTOMATED

Authors M Chui, J Manyika, and M Miremadi





# Example Of Jobs lost to Future Automation



Cashier

Delivery people

Drivers

Most factory workers

Medical diagnosis

Accountants

Loan Officers

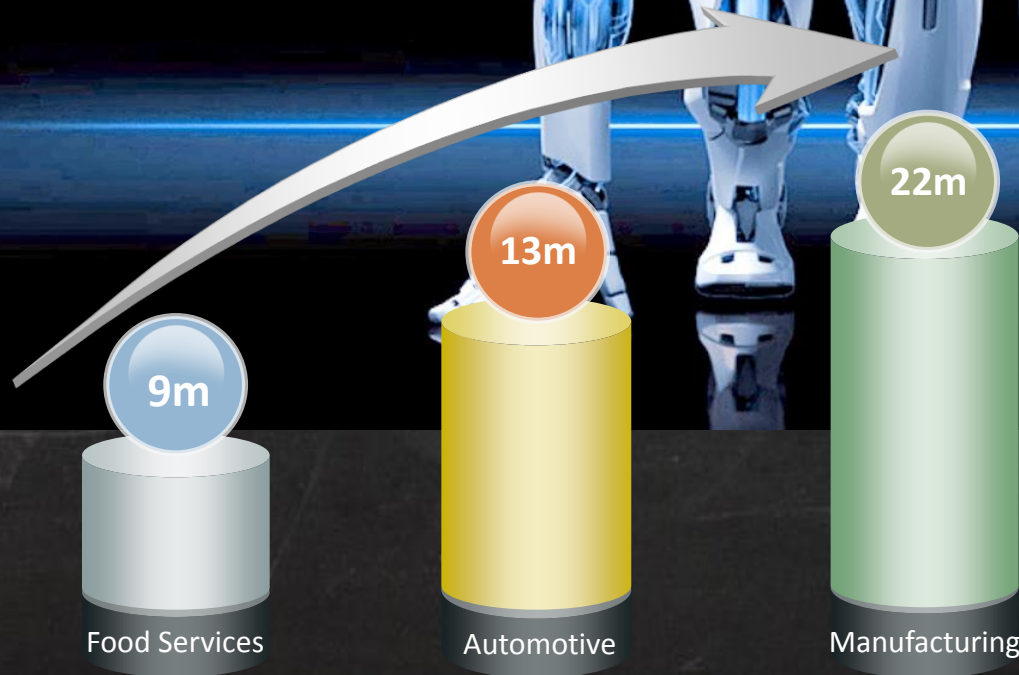
Security Guards

Retail Salesperson

# The robotics market is expected to be worth close to \$70B by 2025

Boston Consulting Group

## Jobs Lost in USA to Automation by 2025



Source: World Robotics Report. "Robotic Nation" by Marshal Brain IEEE Spectrum



*"The top 10 in-demand jobs in the future don't exist today. We are currently preparing students for jobs that don't yet exist, using technologies that haven't been invented, in order to solve problems we don't even know are problems yet."*

Changing How America Works, former U.S. Secretary of Education Richard Riley





Roughly 15 years ago many of today's most demanded jobs like **IOS & Android developer**, **Social Media** related jobs, **big data scientist**,... did not exist!



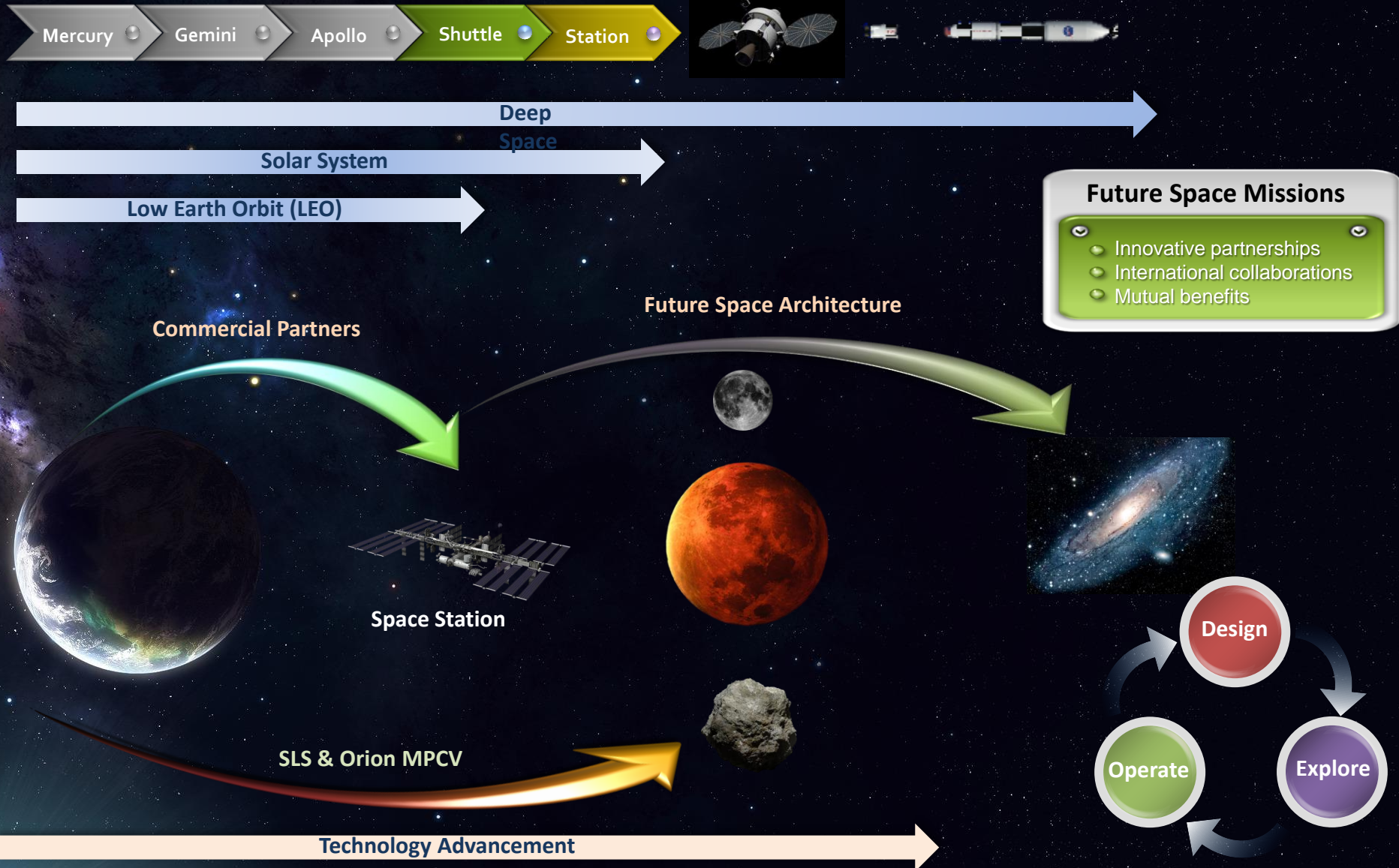


Bridge the gap between academic institutions and industry in terms of education needed to fill the future jobs, and technology produced is aligned with industry needs

Strategize about what is going to be main stream in the next 10-15 years and start investing today



# Human Spaceflight Missions





Supporting nearly **63 million** jobs and **\$2.7 trillion** in global GDP, the air transport industry is a **driver** of the global economy

<http://aviationbenefits.org/economic-growth>







In 2014, the global space economy grew to  
\$330 Billions

*The Space Report 2015: The Authoritative Guide to Global Space Activity*



# What will be the next Game changing Technology?





# Future mainstream Technologies



# Advanced Autonomous Systems, AI & Robots







# Big Data, & IoT



# Driverless Cars



5MB Hard Drive 1956



512 GB Drive 2014

# Miniaturization



5

Internet  
- websites  
- hosting  
- banners  
- searching systems  
- blogs  
- chats  
- applications



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  parameter 239 "gi.savedRaysPerFrame" 1
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world data

Finance Business Culture  
Weather Sport News Video  
Radio Techniques Files  
Electronics Shopping Design  
Mail Internet Maps Radio  
TV Work Travel Tech  
Entertainment Security  
Global Music Companies  
Songs Graphics Vacancy  
Job Data Games People

# Augmented Reality





# Autonomous Flying Vehicles



**3D** Manufacturing





**Synthetic Biology**

# Plus Many More...



Technologies that may also impact  
**various** industry